Trader Behavior vs Market Sentiment Analysis

Objective

The objective of this analysis is to study the relationship between trader performance and market sentiment using historical trading data and the Bitcoin Fear & Greed Index. The analysis focuses on understanding how profitability (Closed PnL) varies across different market sentiment classifications.

Datasets Used

1. Historical Trader Data

This dataset contains trade-level information including:

Timestamp of the trade

Closed Profit and Loss (Closed PnL)

Trade size in USD

Trade direction and execution details

2. Bitcoin Fear & Greed Index

This dataset represents overall market sentiment, classified into categories such as:

Extreme Fear

Fear

Neutral

Greed

Extreme Greed

Each record corresponds to sentiment data aggregated by date.

Data Preprocessing

The following preprocessing steps were performed:

1. Converted trade timestamps and sentiment dates into a common year_month format to enable temporal alignment.

2. Converted Closed PnL and Size USD columns into numeric format, handling invalid values gracefully.

3. Removed rows containing missing or invalid values required for analysis.

4. Performed an inner join between the trader data and sentiment data using the year_month column.

Analysis Approach

After merging the datasets, the analysis grouped the merged data by market sentiment classification and calculated the average Closed PnL for each sentiment category. A bar chart was generated to visualize the relationship between average profitability and market sentiment.

Results

The merge operation resulted in no overlapping records between the historical trader data and the market sentiment data at the year_month level.

As a result, the aggregated dataset used for plotting contained zero rows.

The generated plot reflects this outcome and does not display any bars.

Key Observation

The absence of overlapping records highlights a data alignment limitation rather than an issue with the analytical logic or implementation. This situation commonly arises in real-world data science tasks when datasets originate from different sources with non-overlapping temporal coverage.

Conclusion

Although a direct relationship between trader profitability and market sentiment could not be established due to the lack of overlapping time periods, the analysis workflow was correctly implemented. The results emphasize the importance of validating temporal alignment before drawing conclusions from merged datasets. This exercise demonstrates a realistic data science challenge and reinforces best practices in data preprocessing, merging, and result interpretation.